# Table of Contents

## Preface
vii

## Acknowledgments
ix

## How to Use This Book
xi

## Topic I: Mathematics and Advanced Engineering Mathematics

- Analytic Geometry and Trigonometry 1-1
- Algebra and Linear Algebra 2-1
- Calculus 3-1
- Differential Equations and Transforms 4-1
- Numerical Methods 5-1

## Topic II: Probability and Statistics

- Probability and Statistics 6-1

## Topic III: Statics

- Systems of Forces and Moments 7-1
- Trusses 8-1
- Pulleys, Cables, and Friction 9-1
- Centroids and Moments of Inertia 10-1

## Topic IV: Dynamics

- Kinematics 11-1
- Kinetics 12-1
- Kinetics of Rotational Motion 13-1
- Energy and Work 14-1
- Vibrations 15-1

## Topic V: Strength of Materials

- Stresses and Strains 16-1
- Thermal, Hoop, and Torsional Stress 17-1
- Beams 18-1
- Columns 19-1

## Topic VI: Materials Science

- Material Properties and Testing 20-1
- Engineering Materials 21-1

## Topic VII: Fluid Mechanics and Dynamics of Gases and Liquids

- Fluid Properties 22-1
- Fluid Statics 23-1
- Fluid Dynamics 24-1
- Fluid Measurement and Similitude 25-1
- Compressible Fluid Dynamics 26-1
- Fluid Machines 27-1

## Topic VIII: Heat, Mass, and Energy Transfer

- Properties of Substances 28-1
- Laws of Thermodynamics 29-1
- Power Cycles and Entropy 30-1
- Mixtures of Gases, Vapors, and Liquids 31-1
- Combustion 32-1
- Heat Transfer 33-1

## Topic IX: Chemistry

- Inorganic Chemistry 34-1

## Topic X: Electricity, Power, and Magnetism

- Electrostatics 35-1
- Direct-Current Circuits 36-1
- Alternating-Current Circuits 37-1
- Amplifiers 38-1
- Three-Phase Electricity and Power 39-1

## Topic XI: Instrumentation and Data Acquisition

- Computer Software 40-1
- Measurement and Instrumentation 41-1
- Signal Theory and Processing 42-1
- Controls 43-1

## Topic XII: Safety, Health, and Environment

- Safety, Health, and Environment 44-1

## Topic XIII: Engineering Economics

- Engineering Economics 45-1

## Topic XIV: Ethics and Professional Practice

- Professional Practice 46-1
- Ethics 47-1
- Licensure 48-1